



NEXT MEETING - Electronics and the Atlantic Battle

For our April meeting we will welcome the return of our good friend Stan Wood to provide another lecture in his series on the history of radio communication and radio related subjects.

Stan enjoys researching historic documents for notable events in the evolution of electronics, this information together with illustrations, he assembles for presentation to interested audiences such as our Society.

The meeting opens at 7.30pm on Tuesday 5th April in the Marconi College, Arbour Lane, Chelmsford.

During this meeting the 'Bumper Raffle' will be drawn, with the prize being a 1994 RSGB Call Book.

DATES FOR YOUR DIARY

5 Apr. CLUB MEETING - The Atlantic Battle - Stan Wood.
17 Apr. CAMBRIDGE REPEATER RALLY - Chesterton, Cambs.
23 Apr. INTERNATIONAL MARCONI DAY - See RadCom Page 6.
3 May CLUB MEETING - Digital HF Receivers - R. Easom.

VISIT TO STANSTED - Brian, G3CVI

Plans for a second group of club members to visit the inner workings of Stansted Airport are CURRENTLY ON HOLD.

The visit will take place and Brian will make an announcement regarding details at the April meeting.

MEMBERS NEWS

This month we are pleased to welcome a new member to the Society, Eric Johnston, G8PHN who joined at the last meeting.

FIELD DAY SURVEY

Many thanks to all the stations who participated on Sunday 13th March, in particular Gwyn, G4FKH and Brian, G0BDS who operated the test station on the windswept site at Tiptree.

Gwyn has compiled a table of signal reports for the consideration of the committee. A copy of the survey report will be on the notice board at the April meeting.

AH1A HOWLAND ISLAND DXPEDITION

Follow-up by Charles, G0GJS

You will recall in the showing of the video at the January Video Show that a memorial to the aviator Amelia Earhart appeared and the comment was made that it was damaged by the Japanese during WW2. The following is further information about her association with Howland Island:-

EARHART, Amelia (1897-1937), one of the most intriguing mysteries of the 20th century is:- What happened to Amelia Earhart? In June 1937 she and her co-pilot, Lieutenant Commander Fred J. Noonan, left Miami, Fla., on an around-the-world flight attempt in a twin-engine Lockheed aircraft. On July 2 the plane vanished near Howland Island in the South Pacific. The world waited with fascination as search teams from the United States Army and Navy, along with the Japanese navy, converged on the scene. But not she, Noonan, or the plane was ever found.

As time went on, questions were raised about the flight; was it simply an around-the-world adventure, or was she perhaps sent to spy on Japanese war preparations for the United States government? Historians have claimed that she was almost certainly forced down and killed by the Japanese.

COMMITTEE MEETING

The April Committee meeting will be held at 7.30pm on Wednesday 13th April, you are welcome to join us.

LAST MONTHS MEETING

Report by Geoff, G7KLV

We were pleased to welcome Alan Sargeant, Principal Engineer Radio Communication, Anglian Water to tell us about the use of radio communications within his Company.

His illustrated talk was divided into four sections:-

1. Anglian Water (AW).
2. Existing PMR.
3. Telemetry, What and Why.
4. New PMR Trunk System.

Anglian Water PLC was floated in 1989 to provide sewage and water services in an area stretching from the Thames to the Humber and is divided into four administrative areas with offices at Colchester, Norwich, Oundle and Lincoln. Prior to 1989 AW was also involved with land drainage, rivers and sea defences but these activities have passed to the National Rivers Authority (NRA) who also undertake pollution policing. The private water supply companies retained their separate existence i.e. Tendring, Essex, Cambridge and Suffolk.

The existing AW PMR system consists of four control centres, at the offices noted above, and include 51 base stations at 31 base sites to control 1800 mobile units and 50 "fixed mobile" units. Full selective calling facilities are provided together with queuing and signal strength voting to select the best signal path.

Base sites are generally water towers and single folded dipoles are used together with aerial filters, cavity combiners and circulators to separate the transmitted and received signals. Base sites have 24 hour battery back up. Mobiles are a mixture of Marconi, Philips and Tait with some units having synthesisers. Servicing is carried out in house except for surface mount equipment.

The system operates on VHF FM low band using frequencies around 71 MHz and 85 MHz for mobile TX and RX respectively. Base and mobile transmit levels are 25 Watts. The existing PMR system has evolved from many parochial AM and FM systems.

In 1991 the Radio Communication Agency invited the water industry to re-consider their PMR requirements. Agreement was eventually reached to promote a unified system within the boundaries of AW to include NRA and the private companies and the mobile fleet will exceed 3000.

The result is a trunked scheme, due 1995, with frequency distribution on a cellular basis using the 26 national low band water channels. Control and traffic channels are allocated. A trunk system will be used and all major offices will be connected by at least two land line routes. The number of base sites has been increased to 60 and the base TX power has been reduced to 10 watts. There is a tendency away from "high" sites giving wide area coverage to the use of in-fill sites to give coverage in difficult locations. Both sewage and river activities require good radio coverage in low lying areas and extensive use was made of computer signal strength predictions for PMR and telemetry.

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INCREASING METER SENSITIVITY - Geoff, G7KLV

When you go to the junk box to find a meter the chances are that you can find the shape and size you want but the sensitivity is wrong. The chances are that the meter is scaled in milliamps (mA) when you require microamps (uA). That's life!

Using a cheap Integrated Circuit in the form of an OPAMP will overcome this problem and enable you to drive, for example, a one milliamp meter from a few microamps. You do, however, need both a positive and a negative supply of a few volts at a milliamp or so.

In mains powered transistorised equipment one supply will be available and the other polarity supply can be obtained quite easily by using another rectifier connected to the mains transformer. In valve equipment the heater supply can be rectified. Use Zeners to provide stable supplies. It is also good practice to decouple each supply to ground with 100nF capacitors at the OPAMP supply pins.

Having suggested methods of providing the supplies, let's look at the circuit.

The 741 IC is quite suitable though any other type would do provided it's got the same pinning.

R2 effectively limits the maximum meter current, which in the case shown, is roughly 2.5mA.

RV1 provides a "Set Zero" preset which may not be considered necessary. Adjust it for zero reading with no input.

R4 and R5 provide stabilizing feedback and set the input sensitivity. R5 can be a preset adjusted for the required sensitivity.

With R1 set at 100 ohms and for a meter f.s.d. of 100uA the voltage input to the OPAMP is 10mV.

If greater sensitivity is required R1 can be increased to 1k to give a meter f.s.d. of 10uA.

It is probably best to keep the input voltage as high as possible and apply as much feedback as possible by increasing R5 to give the required sensitivity.

The positive supply should be 9 volts and the negative supply can be the same but it can, if more convenient, be reduced to 5 volts.

The circuit can be adapted for use with a 10mA meter but the positive supply should be increased to 15 volts and R2 removed.

If the input current is negative with respect to the 0V line reverse the meter connections but note that in this case the positive supply only can be reduced to 5 volts if more convenient.

The circuit can also be used as a voltmeter as it's input resistance is fairly high when R1 is removed. Suitable voltage divider resistances can be added to give the required range.

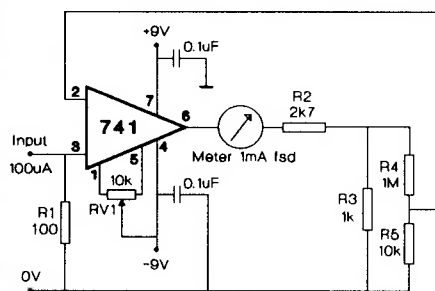
Having read the draft of this note our Editor pointed out what should have been obvious to me!

He reminded me that OPAMPS are available which only require a single supply. Amongst these are the CA3130, 3140, 3240. The circuit is the same as for the 741 except that pin 4 (the negative supply) should be connected to the 0 volt line. Zeroing seems to be more critical and the zero adjustment should be made with no input and the control set so that the meter just starts to indicate the merest sniff of current.

If at all possible I think the use of two supplies is preferable but of course circumstances will dictate. This circuit has proved to be very good tempered and if it doesn't work first time the chances are that you've got a wiring fault. Whilst there is nothing new or original about this circuit it is hoped that it may prove useful to constructors. It might also tempt those who haven't used OPAMPS's to have a go!

These and many more OPAMP circuits are described in OP-AMP Circuits Manual by R. M. Marston.

Many thanks to all members who have contributed with items for this months Newsletter. The book review is worthy of a supplement to this edition. Ed.



LAST MONTHS MEETING (continued)

Telemetry has reduced the necessity for routine visits to sewage and water pumping stations, treatment works and land drainage installations. AW have therefore made a considerable investment in telemetry particularly with their numerous sewage pumping stations.

AW has approximately 5500 telemetry outstations of which about 4000 use UHF radio in the 460 MHz band, the remainder being line connected. Each radio site is individually licensed and the TX power is preset between 10 mW and 5 watts depending on the path loss to the scanning station. Scanning rates vary between 2 mins and 1 hour. Scan aerials are 6 dB collinear and outstations have 12 element Yagis. Battery standby is standard.

To illustrate the telemetry a sewage pumping station at Boreham was described. This consists essentially of a wet well filled by gravity and a dry well housing the pumps and motors. The pumps are controlled by an ultrasonic level detector between set limits.

As the level rises the pumps start and the sewage is pumped to Chelmsford works.

High level float switches are fitted in the wells. That in the wet well alarms as well as switching on pumps. That in the dry well alarms if the pumps leak with danger of flooding the motors.

The outstation fitted has provision for 32 digital inputs, 8 digital outputs and 7 analogue inputs.

The main parameters of interest are [a] presence of mains, [b] state of motor overload trips, [c] pump control (hand or auto), [d] pump running, [e] motor current, [f] wet well high level, [g] dry well high level. This information can be displayed in the control centre on mimic diagrams. There are pre-determined levels for analogue parameters and if these are exceeded or if certain other conditions occur e.g. mains failure, an alarm will sound and the controller will advise local personnel as required.

At this point some rather leading questions were posed by members (sitting in the second row from the front) as to what happens when their local station misbehaves! The first step would be a visit by operating or maintenance personnel to rectify the problem. In case of mains failure a standby generator would be sent to site. In the case of machinery failure a tanker would be used to pump out. If all else fails there would be an overflow to ditch or river but this is avoided since such cases have to be notified to the NRA. That is an abomination to AW and entails a 'carpet job' for those responsible!

Local supervisory staff have terminal facilities via the PSTN network to access the telemetry. The working of Roxwell sewage works was also demonstrated and used similar monitoring methods for the automatic process control. In addition the throughput and final effluent purity are monitored. All the information gathered is stored and used for management purposes.

It was obvious that Alan's wide ranging talk generated much interest judging by the many questions put to him during the evening. Our thanks to him for a very entertaining and enjoyable evening.

NEWS FROM BACKNANG

We are pleased to report that Peter, DK7SP has at long last had his 6M licence renewed and it is valid until the end of this year.

All Class B holders in Germany (their top grade of licence) may apply for a licence for 6M, the authorities review the situation at the end of each year and the licence has to be re-applied for together with a report of their activity on the band during the past 12 months.

THANK YOU - Ela, G6HKM

I would like to say thank you for all the get well wishes received, we were very sorry that we could not make the last meeting and I will try to 'do better' in future!

73 from Roy & Ela Martyr,
G3PMX & G6HKM

☎ (0245)360545

1, High Houses,
Mashbury Road,
Great Waltham,
CHELMSFORD,
Essex, CM3 1EL.